Radiative Processes in Planetary Atmospheres
ATOC/ASTR 5560

Fall 2003
Meeting Time: Mon &Wed 3:00-4:15 PM
Room:STAD 136C

NOTICE: August 25 and 27 class will be in Duane G1B35

Instructor: Dr. Irina Petropavlovskikh
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http://titan.srrb.noaa.gov/personnel/irina/irina.htm

Office Hours: Wed 4:30-6:00 PM (or by appointment)
Room: STAD 255-29

Course web site:
http://titan.srrb.noaa.gov/~irina/ATOC5560_2003/class2003.html

The original version created by Prof. Irina Sokolik is still available at:
http://irina.eas.gatech.edu/LABATOC5560_2002.htm

Pre/co-req: ATOC 5225 or ASTR 5110; ATOC 5235 recommended

Lecture 1, August 25, 2003

Introduction and Logistics

Objectives:

1. This course will discuss: many roles of radiative transfer processes in the atmosphere

2. How this course is organized:
   Lectures and hands on problems
   Homework
   Class paper
   Midterm Exams

3. Required/additional reading.

4. Grading

1. What this course is about

- This course provides a foundation for understanding the theoretical and problem solving principles of radiative transfer in planetary atmospheres with application of computer modeling.

- **The main focus is on the interaction of gases, clouds, and aerosols with ultraviolet, visible, and infrared radiation. These processes are critical for understanding the atmospheric energy budget, remote sensing applications, atmospheric chemistry and major biochemical cycles.**

- The overall goal of this course is to prepare a student in formulating and solving radiative transfer problems for a wide range of applications.

2. How this course is organized:

Lectures

Lectures are developed to provide the most critical material and to complement a textbook.

Lecture notes will be posted (in PDF format) at the course website:

http://titan.srrb.noaa.gov/~irina/ATOC5560_2003/class2003.html

!!!! Please review lecture materials before coming to the class.

Examples of Computer Modeling Laboratories will be given in the class and can be used for self-study

http://irina.eas.gatech.edu/LABATOC5560_2002.htm

Goals are to learn about radiative numerical codes and obtain hands on experience in running these codes and explaining the model results.

Homework

Will be posted (in PDF format) at the course website.
Please turn in your homework in time.

Class paper (written report)

Goal is to perform the radiative transfer modeling and interpretation of the results in a well-defined problem.

Exams

Two midterm exams, but no final exam.

3. Required/additional reading.

Required Text:

An Introduction to Atmospheric Radiation, Liou, 2002.
(Textbook is available at CU Book Store)

Additional Text:

- ***Radiation and cloud processes in the atmosphere*. Liou, 1992**
- ***Atmospheric Radiation*: *Theoretical basis.* R.M. Goody and Y. L. Yung, 1989**
- ***Radiative Transfer in the Atmosphere and Ocean*. G. E. Thomas and K. Stamnes, 1999.**
- ***Absorption and Scattering of Light by Small Particles*. C. Bohren and D. Huffman, 1983.**
- ***Atmospheric transmission, Emission, and Scattering*. Kyle, 1991.**
- ***Atmospheric Radiative Transfer.* J. Lenoble, 1993.**

Internet site Physics 2000 (easy and advanced explanation of principles of Quantum Mechanics and Physics of Light:

http://www.colorado.edu/UCB/AcademicAffairs/ArtsSciences/physics/PhysicsInitiative/Physics2000/index.pl

Grading:

Mid-term exams (2) 50%

Homework 30%

Research Project 20%